AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) A system for detecting a face, comprising:

a memory unit for storing eigenvectors and weights extracted from a plurality of training images;

a facial image recognition unit for extracting eigenvectors and weights of respective face components from an input facial image; and

a facial image decision unit for deriving an algorithm for deciding whether input facial images are occluded using the eigenvectors and weights of the training images stored in the memory unit, and for deciding whether the input facial image is occluded by substituting the eigenvectors and weights of the input image extracted in the facial image recognition unit into the derived algorithm,

wherein the deciding algorithm is expressed as the following equation:

$$f(x) = sign(\sum_{i=1}^{l} y_i \lambda_i K(x, x_i) + b),$$

where y_i, λ_i and b are factors obtained from the training images, and $K(x, x_i)$ is eigenvectors and weights extracted from the input facial image, and

wherein the facial image decision unit is configured to decide the input facial image to be normal if a result value obtained by substituting the eigenvectors and weights into the decision algorithm is 1 and to decide the input facial image to be occluded if the result value is -1.

2. (Previously Presented) The system according to claim 1, wherein the eigenvectors and weights of the training images stored in the memory unit are classified into a normal facial image class and a occluded facial image class.

3. (Original) The system according to claim 1, wherein the facial image recognition unit is configured to extract eigenvectors and weights of the respective facial components from the training images.

4. (Original) The system according to claim 1, wherein the facial image recognition unit comprises:

a monochrome part for converting an input color image into a monochrome image;

a facial image detection part for detecting a facial region from the converted monochrome image;

a facial image normalization part for normalizing the detected facial region;

a facial image division part for dividing the normalized facial region into higher and lower regions; and

an eigenvector/weight extraction part for extracting the eigenvectors and weights of the respective facial components using a principal component analysis (PCA) according to the divided facial regions.

5. (Original) The system according to claim 4, wherein the facial image division part is configured to divide an entire facial region into the higher region centered on the eyes and the lower region centered on the nose and mouth.

6. (Original) The system according to claim 4, wherein the eigenvector/weight extraction part is configured to extract the eigenvectors and weights from the divided regions centered on the eyes and on the nose and mouth which are preset in the facial image division part.

7. (Original) The system according to claim 2, wherein the facial image decision unit is configured to set a value of the normal facial image class and a value of the occluded facial image class to be different from each other and to derive the decision algorithm using the set values of the classes, eigenvectors and weights of the training images.

8. (Canceled)

9. (Canceled)

10. (Original) The system according to claim 5, wherein the facial image decision unit is configured to perform a process of simultaneously deciding whether the facial image is occluded in the higher and lower regions.

11. (Currently Amended) A method for detecting a face, comprising the steps of:

(a) extracting eigenvectors and weights of respective facial components from an input facial image; and

(b) obtaining an occluding-decision algorithm for deciding whether input facial images are occluded using eigenvectors and weights of a plurality of training images,

and deciding whether the input facial image is occluded by substituting the extracted eigenvectors and weights of the input image into the occluding-decision algorithm,

wherein the occluding-decision algorithm is expressed as the following equation:

$$f(x) = sign(\sum_{i=1}^{l} y_i \lambda_i K(x, x_i) + b),$$

where y_i, λ_i and b are factors obtained from the training images, and $K(x, x_i)$ is eigenvectors and weights extracted from the input facial image, and

wherein step (b) comprises the step of:

deciding the input facial image to be normal if a result value obtained by substituting the eigenvectors and weights into the decision algorithm is 1, and to be occluded if the result value is -1.

12. (Previously Presented) The method according to claim 11, wherein step (a) comprises the steps of:

(a1) converting the input facial image into a monochrome image;

(a2) detecting a facial region from the converted monochrome image;

(a3) normalizing the detected facial region;

(a4) dividing the normalized facial region into higher and lower regions; and

(a5) extracting the eigenvectors and weights of the respective facial components using principal component analysis (PCA) according to the divided facial regions.

13. (Previously Presented) The method according to claim 11, wherein the step of obtaining the occluding-decision algorithm comprises the steps of:

extracting the eigenvectors and weights of the respective facial components from the training images in which normal and occluded facial images are included and setting values of normal and occluded facial image classes to be different from each other; and

deriving the occluding-decision algorithm using the extracted values of the image classes, eigenvectors and weights of the training images.

14. (Original) The method according to claim 13, wherein the training images are facial images to which scaling shift or rotation change is applied.

15. (Original) The method according to claim 12, wherein in step (a4), an entire facial region is divided into the higher region centered on the eyes and the lower region centered on the nose and mouth.

16. (Original) The method according to claim 12, wherein in step (a5), eigenvectors and weights are extracted from the divided regions centered on the eyes and on the nose and mouth, respectively, which are preset according to the facial regions.

17. (Canceled)

18. (Canceled)

19. (Original) The method according to claim 15, wherein in step (b), it is simultaneously determined whether the facial image is occluded in the higher and lower regions.

20. (Currently Amended) [[A]] The method according to claim 11, further ~~for authenticating a facial image,~~ comprising the steps of:

~~extracting eigenvectors and weights of the respective facial components from a plurality of training images in which normal and occluded facial images are included and setting values of normal and occluded facial image classes to be different from each other;~~

~~deriving an occluding-decision algorithm using the extracted values of the image classes, eigenvectors and weights of the training images.~~

~~extracting eigenvectors and weights of respective facial components from an input facial image;~~

~~deciding whether the input facial image is occluded by substituting the extracted eigenvectors and weights of the input facial image into the derived occluding-decision algorithm;~~

transmitting a warning message if it is determined that the input facial image is occluded, and deciding again whether the input facial image is occluded; and

rejecting authentication if it is determined that the input facial image is occluded three times or more.